REMARKS

Claims 1-13 remain present in this application.

Claims 1-3 stand rejected under 35 USC 103 as being unpatentable over HIGUCHI, U.S. Patent No. 5,790,400, in view of NARA et al., U.S. Patent No. 6,388,747 B2, and NARUOKA, U.S. Patent No. 6,300,147. This rejection is respectfully traversed.

Claims 4, 5, 8 and 9 stand rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of LI, U.S. Patent 6,276,997. This rejection is respectfully traversed.

Claim 6 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of SANDOVAL, U.S. Patent 6,345,259. This rejection is respectfully traversed.

Claim 7 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of WEBSTER, U.S. Patent 5,505,090. This rejection is respectfully traversed.

Claim 10 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of SCHMOLKE et al., U.S. Patent 6,333,785. This rejection is respectfully traversed.

Claim 11 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and

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further in view of CHARLES, U.S. Patent 6,335,559. This rejection is respectfully traversed.

Claim 12 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of HINKLE, U.S. Patent 6,190,313. This rejection is respectfully traversed.

Claim 13 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and NARUOKA, and further in view of JUSZKIEWICZ et al., U.S. Patent 6,353,169. This

Claims 1-3

With regard to claims 1-3, none of Higuchi, Nara, and Naruoka teaches or suggests a system for monitoring stability of manufacturing equipment and adjusting inspection frequency according to inspection results obtained during the monitoring process.

Higuchi teaches: "An object inspection apparatus for **clearly indicating the inspecting positions of an object under inspection** so that inspection work thereon is performed efficiently has its inspection terminal set up on an inspection line. An image of the part to be inspected and a plurality of inspection items associated therewith are displayed on a screen of the terminal. The **worker** in charge of inspection performs inspection by **following what is thus displayed**..."

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Additionally, Higuchi teaches in col. 8: "In the inspection process of step 207, inspection is carried out as many times as the sampling rate determined in step 206. For example, if the determined sampling rate is 32, a total of 32 parts are inspected."

Accordingly, Higuchi teaches an object inspection apparatus for clearly indicating the inspecting positions of an object under inspection. The focus of the object inspection apparatus taught by Higuchi is to clearly indicate the inspecting positions of the inspected object, thus enabling workers with no specific skills to carry out the inspection. However, Claim 1 of the claimed invention discloses a system for monitoring stability of manufacturing equipment by inspecting semi-manufactured products periodically during production. According to the claimed invention, inspection is directed by a process executor and carried out automatically. Therefore the "inspecting positions of the object", the major issue of the object inspection apparatus taught by Higuchi, are not at issue in the claimed invention.

Furthermore, the "sampling rate" taught by Higuchi is a setting specifying the **sampling ratio** of parts to be inspected. In other words, the "sampling rate" taught by Higuchi is the number of parts checked per batch, depicted in Fig. 2 as a box of parts. On the contrary, the "sampling rate" in the claimed invention is the number of inspections performed in a predetermined period of time, a **sampling frequency**. Therefore, the "sampling rate" taught by

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Higuchi is irrelevant to the sampling rate taught in the claimed invention.

Nara teaches: "Inspection method, apparatus, and system for a **circuit pattern**, in which when various conditions which are necessary in case of inspecting a fine circuit pattern by using an image formed by irradiating white light, a laser beam, or a charged particle beam are set, its operating efficiency can be improved..."

Additionally, Nara teaches in col. 28, lines 58: "The sampling rate is a rate at which the inspection region is thinned out."

Accordingly, the focus of the inspection apparatus taught by Nara is to solve the problem of throughput deterioration caused by inspection operation. Claim 1 of the claimed invention discloses a system of monitoring stability of manufacturing equipment by inspecting semi-manufactured products periodically during production. However, the inspection apparatus taught by Nara does not focus on monitoring stability of manufacturing equipment, as does the claimed invention.

Furthermore, the "sampling rate" taught by Nara is number of chips inspected per wafer, which creates a **spatial sampling ratio**. On the contrary, the "sampling rate" in the claimed invention is the number of inspections performed in a predetermined period of time, a **sampling frequency**. Therefore, the "sampling rate" taught by Nara is irrelevant to the sampling rate taught in the claimed invention.

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Naruoka teaches a method of inspecting a crystal defect or the like in a surface semiconductor layer of an SOI (silicon on insulator or semiconductor on insulator) substrate serving as a semiconductor substrate. The inspection method taught by Naruoka is used for quality control of a semiconductor substrate before it is further processed, thus only a semiconductor substrate of certain quality undergoes further processing in the manufacture of semiconductor devices. The **inspection result** obtained from the inspection method taught by Naruoka is not used for feedback control of the manufacturing equipment, but for **determining whether the inspected SOI substrate is suitable for manufacturing semiconductor devices.**

Additionally, Naruoka teaches in columns 7 and 8: "Further, the SOI substrate 1 can be subjected to quality control with this inspection method ST10. When a device maker manufactures a desired semiconductor device with the SOI substrate 1, for example, the inspection method ST10 is applied to some of a plurality of SOI substrates 1 manufactured in the same lot when accepting the SOI substrates 1 or before introducing the same into the manufacturing steps for executing sampling inspection/evaluation (steps ST51 and ST52), as shown in a flow chart of FIG. 5."

Accordingly, the so-called sampling inspection technique suggested by Naruoka is used for selecting a plurality of SOI substrates from a lot to serve as inspection samples. The "sampling inspection technique" takes a sample of SOI substrates

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from a lot for inspection. In other words, the "sampling inspection technique" suggested by Naruoka is a sampling method, wherein some SOI substrates of a certain lot are selected to be the inspection objects.

Also, none of Higuchi, Nara, and Naruoka teaches or suggests a system capable of monitoring run-to-run variability in semiconductor manufacturing.

As discussed above, Higuchi teaches an object inspection apparatus for assisting workers in inspecting objects, and Nara teaches an inspection apparatus for adjusting inspection conditions in a circuit pattern inspection. Both focus on improving inspection efficiency within a certain machine-run, but teach nothing about run-to-run process control.

Naruoka teaches a method of inspecting semiconductor substrates, wherein a conventionally undetectable defect is detected and identified. By effectively detecting defects, quality of a certain SOI lot can be correctly estimated, thus it can be determined whether the SOI lot is suitable for manufacturing semiconductor devices.

The claimed invention, however, teaches a system for monitoring run-to-run variability and enables run-to-run process control in a wafer-manufacturing environment. The system in the claimed invention allows **modification of a product recipe between machine runs, thereby minimizing process drift, shift, and variability, and thus, costs.**

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Since none of Higuchi, Nara, and Naruoka teaches about the focus of the claimed invention, i.e. the ability to monitor run-to-run variability, the claimed invention as a whole cannot be obtained through the combination of the prior art.

Accordingly, reconsideration and withdrawal of the 35 USC 103 rejection of claims 1-3 are respectfully requested.

Claims 4-13

With regard to the rejections of claims 4-13, since Higuchi, Nara, and Naruoka teach nothing about the focus of the claimed invention, the teachings of Claims 4-5 and 8-9 cannot be obtained by including the teachings of the cited prior art in Higuchi, Nara, and Naruoka system. The secondary references utilized by the Examiner fail to overcome the deficiencies of the primary references.

Accordingly, reconsideration and withdrawal of the 35 USC 103 rejections of claims 4-13 are respectfully requested.

Conclusion

As described above, the claimed invention teaches a system capable of monitoring run-to-run variability and operating **run-to-run process control**. The run-to-run control ability enables the product recipe with respect to a particular machine process to be modified between runs, so as to minimize process drift, shift, and variability. The claimed invention teaches a system for monitoring

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equipment stability and making adjustments to the process in order to improve the effective output and increase yield at the end of the next run. The above-mentioned benefit cannot be obtained by the cited prior art.

Accordingly, reconsideration and withdrawal of the 35 USC 103 rejections are respectfully requested.

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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